IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re:	PAYNE, Stephen A.	Examiner:	KHAN, Amina S.
Serial No.:	10/521,829	Art Unit:	1751
Filed:	August 1, 2005		
For:	DURABLE ANTIMICROBIAL LEATHER		

APPEAL BRIEF

TABLE OF CONTENTS

I. REAL PARTY IN INTEREST

The real party in interest is Microban Products Company, the assignee of record and a subsidiary of Microban International, Ltd.

II. RELATED APPEALS AND INTERFERENCES

There are no known prior and pending appeals, judicial proceedings or interferences known to Appellant which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1-22, 29-30 and 36 are canceled.
Claims 23-28, 31-35 and 37-68 are rejected.
Claim 48 is canceled herein.
Claims 23-28, 31-35, 37-47 and 49-68 are being appealed.

IV. STATUS OF AMENDMENTS

No Amendment After Final has been filed in this case.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Claim 23 defines a method for the aqueous treatment of leather to impart durable antimicrobial properties thereto (page 4, lines 5-16; page 5, line 23 to page 6, line 5; page 8, line 21 to page 9, line 5; page 14, lines 20-30). The method comprises cleaning the leather (page 4, lines 26-31); a first soaking of the leather in an antimicrobial composition (page 4, lines 5-16; page 4, line 26 to page 5, line 7; page 5, line 23 to page 6, line 5; page 6, line 15 to page 7, line 15; page 7, line 29 to page 8, line 9; page 8, line 21 to page 9, line 12) including a biguanide bactericide (page 5, lines 14-18) and a fungicide (page 3, line 14 to page 4, line 4; page 5, lines 1-13 and 19-22; page 7, lines 1-10; page 14, lines 1-30) present in a specific ratio range (page 5, lines 8-13; page 7, lines 1-10; page 7, line 29 to page 8, line 2; page 8, lines 18-20; page 10, lines 1-15; page 14, lines 1-12 and 20-30); a first soaking of the leather in fat liquors (page 6, line 6 to page 7, line 15; page 7, line 29 to page 8, line 2); soaking the leather in an aqueous solution containing a tanning agent (page 5, line 23 to page 6, line 30); and rinsing the leather (page 5, line 23 to page 6, line 30; page 7, lines 23 and 28; page 8, lines 10-11; page 8, line 21 to page 9, line 12). The first soaking of the leather in an antimicrobial composition can occur before the first fatliquoring (page 5, line 23 to page 7, line 10) or concurrently with the first fatliquoring (i.e., the antimicrobial composition can be included in the first fatliquor) (page 5, line 23 to page 7, line 10).

Claim 45 recites a method for making a durably antimicrobial leather (page 3, line 14 to page 4, line 16). A cleaned leather is first soaked in an antimicrobial composition in the presence of an emulsifier (page 6, lines 6-14; page 8, line 21 to page 9, line 17). The antimicrobial composition includes a biguanide bactericide (page 5, lines 14-18) having a concentration in the composition of about 500 ppm to about 10,000 ppm based on the weight of the leather (page 5, lines 8-13; page 7, line 29 to page 8, line 2; page 14, lines 1-12 and 20-30), and a fungicide (page 3, line 14 to page 4, line 4; page 5, lines 1-13 and 19-22; page 7, lines 1-10; page 14, lines 1-30) having a concentration in the composition of about 200 ppm to about 5,000 ppm based on the weight of the leather (page 5, lines 8-13; page 7, line 29 to page 8, line 2; page 14, lines 1-12 and 20-30). The biguanide bactericide and fungicide are present in the composition in a ratio between about 1:50 to about 10:1 fungicide to biguanide bactericide (page 5, lines 8-13; page 14, lines 1-12 and 20-30). A first fatliquoring of the leather in a first fat liquor is performed (page 6, lin3 6 to page 7, line 15; page 7, line 29 to page 8). The first soaking of the leather in an antimicrobial composition can occur before the first fatliquoring (page 5, line 23 to page 7, line 10) or concurrently with the first fatliquoring (page 5, line 23 to page 7, line 10).

Claim 62 calls out a method for making a durably antimicrobial leather. The method comprises a first soaking of a cleaned leather in an antimicrobial composition (page 3, line 14 to page 4, line 16) in the presence of an emulsifier (page 6, lines 6-14; page 8, line 21 to page 9, line 17). The antimicrobial composition of claim 62 includes isothiazolinone (page 5, line 16) having a concentration in the composition of about 500 ppm to about 10,000 ppm based on the weight of the leather (page 5, lines 8-13; page 7, line 29 to page 8, line 2; page 14, lines 1-12 and 20-30), and a fungicide (page 3, line 14 to page 4, line 4; page 5, lines 1-13 and 19-22; page 7, lines 1-10; page 14, lines 1-30) having a concentration in the composition of about 200 ppm to about

5,000 ppm based on the weight of the leather (page 5, lines 8-13; page 7, line 29 to page 8, line 2; page 14, lines 1-12 and 20-30), wherein the isothiazolinone and fungicide are present in the composition in a ratio between about 50:1 to about 1:5 fungicide to isothiazolinone (page 5, lines 8-13; page 14, lines 1-12 and 20-30). The cleaned leather undergoes a first fatliquoring of the leather in a first fat liquor (page 6, lin3 6 to page 7, line 15; page 7, line 29 to page 8). The first soaking of the leather in an antimicrobial composition can occur before the first fatliquoring (page 5, line 23 to page 7, line 10) or concurrently with the first fatliquoring (page 5, line 23 to page 7, line 10).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Whether claims 23-28, 31-35, 37-39, 41, 44-47, 50-53, 55, 58-65 and 68 are unpatentable under 35 U.S.C. § 103(a) over Pillay, USP 6,110,950 in view of Austin, USP 5,290,810.

B. Whether claims 42-43, 56-57, and 66-67 are unpatentable under 35 U.S.C. § 103(a) over Pillay '950 in view of Austin '810 and further in view of Rother, USP 5,888,415.

C. Whether claims 40 and 54 are unpatentable under 35 U.S.C. § 103(a) over Pillay '950 in view of Austin '810 and in further view of Lindner, USP 6,228,382.

D. Whether claim 49 is unpatentable under 35 §103(a) over Pillay '950 in view of Austin '810 and in further view of Bryant et al., USP 5,087,457.

VII. ARGUMENT

A. Whether claims 23-28, 31-35, 37-39, 41, 44-47, 50-53, 55, 58-65 and 68 are unpatentable under 35 U.S.C. § 103(a) over Pillay, USP 6,110,950 in view of Austin, USP 5,290,810.

A.1. Claim 23 and Claims 24-28, 31, 34-35, 37-39 and 44.

For purposes of this specific rejection, dependent Claims 24-28, 31, 34, 37-39 and 44 rise or fall with the decision as to independent Claim 23.

In relevant part, Claim 23 recites a method including treatment with an antimicrobial composition comprising a biguanide bactericide and a fungicide present in a ratio between about 1:50 to about 10:1 fungicide to biguanide bactericide.

Where a reference teaches a simple combination, the components of that simple combination are susceptible of substitution (1) by like chemicals or (2) by dissimilar components only if such substitutions are taught or suggested. A synergistic combination is not a simple combination, however; it is one with peculiar and non-cumulative properties unforeseen by those of skill in the art. (Accord MPEP § 716.02(a).) Synergistic combinations are surprising and unexpected, especially in view of the unpredictability of chemical inventions.

When a reference discloses a synergistic combination, then, one of ordinary skill understands that the components of that combination cannot be substituted without a teaching or suggestion that the synergism would be subsequently retained. To be clear, Applicant does not say that substitution is never permitted, merely that a substitution which is not reasonably expected to preserve the synergism—and thus, the principle of operation of the prior art invention—is proscribed and would not be carried out by the ordinarily skilled artisan. This reasonable expectation may spring from the prior art teachings or from the skilled artisan's own creativity.

In predicting the conduct of the skilled artisan, it must be remembered that he does not act against the teachings of the art and would not alter an invention in a way that is discouraged by its disclosure. See *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959); *accord* MPEP 2143.01(VI) ("If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious.").)

Turning now to the rejection, Pillay '950 discloses a synergistic antimicrobial combination (propiconazole and 2-mercaptobenzothiazole, widely regarded as a fungicide and a bactericide, respectively). (Pillay '950, *passim*.) The background of the reference makes clear that others had tried antimicrobial agents in leather treatments. The substance of the Pillay '950 invention is its synergistic antimicrobial combination. For Pillay '950, the synergistic combination is the essential feature of the invention, and Pillay '950 discourages loss of the synergism (e.g., through separation of the synergistic components).

Pillay '950 teaches away from substitutions that do not suggest maintenance of the disclosed synergism. Pillay '950 itself teaches: "Only synergism, which is much less likely than an additive or an antagonistic effect, gives a positive result and, therefore possesses economic

advantages." (Pillay '950, column 3, lines 5-7 (underlining added).) A substitution of one of the components of the synergistic combination of Pillay '950, as is done by the Examiner in formulating the rejection, would be expected by those of skill in the art to destroy the synergism discovered by Pillay in the combination.

In this instance, one of ordinary skill in the art instead would be led away by Pillay '950 from separation of a synergistic combination and substitution for a component thereof. Pillay '950 and the other relevant references contain no specific teaching or fair suggestion that such separation/substitution would not disturb the synergism.

Applicant asserts, and the Examiner has admitted, that Pillay '950 alone provides no teaching or suggestion to substitute a biguanide compound for the 2-mercaptobenzothiazole. The Examiner cited Austin '810 to provide the missing suggestion of substitution. More importantly, though, one of ordinary skill would not interpret Austin '810 as suggesting interchangeability of Pillay '950's synergistic components without the destruction of synergism. Austin '810 provides no reassurance that substitutions to the 2-mercaptobenzothiazole of Pillay '950 will retain the synergism of that reference's disclosed combination. The chemical compounds themselves are neither homologs, analogs, nor isomers, nor do they share a close structural relationship.

To clear this legal hurdle, the Examiner asserted that one would substitute the polyhexamethylene biguanide of Austin '810 (mentioned at column 6, lines 21-22) for the 2-mercaptobenzothiazole of Pillay '950 because of the "functional equivalence of these compounds." "Functional equivalence" provides no expectation of synergism. Respectfully, if "functional equivalence" were the proper criterion, any antimicrobial agent could be substituted for 2-mercaptobenzothiazole with the expectation of a synergistic effect.

In reality and in the relevant art, however, that is hardly the case; when two compounds are mixed, synergism is commonly unexpected. As Pillay '950 explains:

> "When two chemical microbiocides are used in combination, either in a single composition or as two separate additions at the point of use, three results are possible: 1) an additive (neutral) effect; 2) an antagonistic effect; or 3) a synergistic effect." (Pillay '950, column 2, line 65 to column 3, line 2.) It is known in the art that synergism "is much less likely than an additive or an antagonistic effect ..." (Pillay '950, column 3, lines 5-6.)

Austin '810 can suggest an obvious "functional" substitution to one-half of the synergistic Pillay '950 combination only if the "functional" substitution would preserve the synergism; else, the principle of operation of the Pillay '950 invention is lost. Austin '810 lacks this suggestion. It should be noted that polyhexamethylene biguanide and 2-mercaptobenzothiazole have markedly different chemical properties and would not be seen by the ordinarily skilled artisan as chemically equivalent.

As Board precedents make clear, however, the present analysis need not seek out precise teachings in the prior art directed to the specific subject matter of the challenged claims, but may take account of the inferences and creative steps that a person of ordinary skill in the art would employ. For the reasons below, there is no reason for the skilled and creative artisan to make the Examiner's proffered substitution with any reasonable expectation that the Pillay '950 synergism would be maintained.

The Federal Circuit has spoken directly regarding the inquiry for chemical combination inventions:

> We elaborated on this requirement in the case of *In re Deuel*, 51 F.3d 1552, 1558 (Fed. Cir. 1995), where we stated that "[n]ormally a prima facie case of obviousness is based upon structural similarity, i.e., an established structural relationship between a prior art compound and the claimed compound.' That is so because close or established "[s]tructural relationships may provide the requisite motivation or suggestion to modify known compounds to obtain new compounds." (Citations omitted.) A known compound may suggest its homolog, analog, or isomer because such compounds "often have similar properties and therefore chemists of ordinary skill would ordinarily contemplate making them to try to obtain compounds with improved properties....
>
> While the KSR Court rejected a rigid application of the teaching, suggestion, or motivation ("TSM") test in an obviousness inquiry, the Court acknowledged the importance of identifying "a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does" in an obviousness determination. (Citation omitted.) Moreover, the Court indicated that there is "no necessary inconsistency between the idea underlying the TSM test and the Graham analysis." (Citation omitted.) As long as the test is not applied as a "rigid and mandatory" formula, that test can provide "helpful insight" to an obviousness inquiry. (Citation omitted.) Thus, in cases involving new chemical compounds, it remains necessary to identify some reason that would have led a chemist to modify a known compound in a particular manner to establish *prima facie* obviousness of a new claimed compound.

(*Takeda Chemical Industries, Ltd. v. Alphapharm Pty., Ltd.*, No. 06-1329, slip op. at pp. 8-9 (Fed. Cir., June 28, 2007) (italics added).)

Any creativity attributed to the person having ordinary skill in the art must be tempered by the direct teachings of the relevant prior art. As stated above, the skilled artisan would not take actions that would contradict the teaching of the closest reference. Identification of a reason that would have led a chemist to not modify a known compound in a particular manner rebuts a *prima facie* showing of obviousness as to the claimed composition.

Here, one skilled in the art would not be motivated to undertake substitutions to the Pillay combination, as the "synergism" and "positive result" of the Pillay '950 combination would not be preserved. Such substitution must either be taught/suggested in the prior art or find a rational basis in the art, else the references fail to establish a *prima facie* case of obviousness.

For these reasons, one of ordinary skill would be taught away from substitutions by Pillay '950, would not interpret Austin '810 as suggesting the modification of Pillay '950 proffered by the Examiner, and would not seek to make the asserted substitution *sua sponte*. The references, alone or together, fail to support a *prima facie* case of obviousness as to either of Claim 23 or to Claims 24-28, 31, 34, 37-39 and 44 depending therefrom.

A.2. Claim 45 and Claims 46-47, 49-51 and 58-61.

Dependent Claims 45-47, 49-51 and 58-61 rise or fall with the decision as to independent Claim 45.

In relevant part, Claim 45 recites a method including treatment with an antimicrobial composition comprising a biguanide bactericide and a fungicide present in a ratio between about 1:50 to about 10:1 fungicide to biguanide bactericide.

Applicant reiterates in full its previous remarks of Section A.1 regarding synergistic combinations, the prior art teachings, the inferences/creativity of the person having ordinary skill in the art, and the impropriety of using a "functional equivalence" basis for substitutions to synergistic chemical combinations (both in general and in this specific case).

For these same reasons, one of ordinary skill would be taught away from substitutions by Pillay '950, would not interpret Austin '810 as suggesting the modification of Pillay '950 proffered by the Examiner, and would not seek to make the asserted substitution *sua sponte*. The references, alone or together, fail to support a *prima facie* case of obviousness as to Claim 45 and claims depending therefrom.

A.3. Claim 32.

Claim 32, depending from independent Claim 23, places a limitation on the fungicide that it be selected from the group consisting of tolyldiiodomethylsulfone, zinc 2-pyridinethiol-1-oxide, propiconazole, thiabendazole, and tebuconazole.

Applicant reiterates in full its previous remarks of Sections A.1 and A.2 regarding the prior art teachings and the inferences/creativity of the person having ordinary skill in the art, and the impropriety of using a "functional equivalence" basis for substitutions to synergistic chemical combinations (both in general and in this specific case). To those remarks, Applicant adds that Pillay '950 alone provides no teaching or suggestion to substitute for 2-mercaptobenzothiazole any of: (a) the fungicides recited in claim 32; (b) tolyldiiodomethylsulfone; or (c) propiconazole.

Mere "functional equivalence" of 2-mercaptobenzothiazole of Pillay '950 with any of tolyldiiodomethylsulfone, zinc 2-pyridinethiol-1-oxide, propiconazole, thiabendazole, or tebuconazole is insufficient under *Takeda* to suggest ready substitution without damage to the principle of operation of the invention of Pillay '950. Moreover, nothing in the general state of the prior art suggests to the skilled artisan that any of these chemical compounds may be substituted with preservation of the synergism of the Pillay '950 combination.

For these reasons, Claim 32 is allowable over the cited hypothetical combination.

A.4. Claim 52.

Claim 52, depending from independent Claim 45, places a limitation on the fungicide that it be selected from the group consisting of tolyldiiodomethylsulfone, zinc 2-pyridinethiol-1-oxide, propiconazole, thiabendazole, and tebuconazole.

Applicant reiterates in full its previous remarks of Sections A.1 through A.3, *supra*, regarding the prior art teachings, the inferences/creativity of the person having ordinary skill in the art, and the impropriety of using a "functional equivalence" basis for substitutions to synergistic chemical combinations (both in general and in this specific case).

For these reasons, Claim 52 is allowable over the cited hypothetical combination, as are its dependent claims.

A.5. Claim 33.

Claim 33, depending from independent Claim 23, places a limitation on the fungicide that it be tolyldiiodomethylsulfone.

Applicant reiterates in full its previous remarks of Sections A.1 through A.4, *supra*, regarding the prior art teachings, the inferences/creativity of the person having ordinary skill in the art, and the impropriety of using a "functional equivalence" basis for substitutions to synergistic chemical combinations (both in general and in this specific case).

For these same reasons, Claim 33 is allowable over the cited hypothetical combination.

A.6. Claim 53.

Claim 53, depending ultimately from independent Claim 45, places a limitation on the fungicide that it be tolyldiiodomethylsulfone.

Applicant reiterates in full its previous remarks of Sections A.1 through A.5, *supra*, regarding the prior art teachings, the inferences/creativity of the person having ordinary skill in the art, and the impropriety of using a "functional equivalence" basis for substitutions to synergistic chemical combinations (both in general and in this specific case).

For these same reasons, Claim 53 is allowable over the cited hypothetical combination.

A.7. Claim 41.

Claim 41, depending from independent Claim 23, places a limitation on the fungicide that it be propiconazole.

Applicant reiterates in full its previous remarks of Sections A.1 through A.6, *supra*, regarding the prior art teachings, the inferences/creativity of the person having ordinary skill in the art, and the impropriety of using a "functional equivalence" basis for substitutions to synergistic chemical combinations (both in general and in this specific case).

For these same reasons, Claim 41 is allowable over the cited hypothetical combination.

A.8. Claim 55.

Claim 41, depending from independent Claim 23, places a limitation on the fungicide that it be propiconazole.

Applicant reiterates in full its previous remarks of Sections A.1 through A.7, *supra*, regarding the prior art teachings, the inferences/creativity of the person having ordinary skill in the art, and the impropriety of using a "functional equivalence" basis for substitutions to synergistic chemical combinations (both in general and in this specific case).

For these same reasons, Claim 55 is allowable over the cited hypothetical combination.

A.9. Claims 62 and 68.

For the purposes of this specific rejection, Claims 62 and 68 rise or fall according to the decision as to independent Claim 62.

In relevant part, Claim 62 recites a method including application of an antimicrobial composition comprising isothiazolinone and a fungicide, wherein the isothiazolinone (having a concentration of about 500 ppm to about 10,000 ppm) and the fungicide (about 200 ppm to about 5,000 ppm) (both based on the weight of the leather) are present in a ratio between about 50:1 to

about 1:5 isothiazolinone to fungicide. The leather is exposed to this antimicrobial composition prior to or concurrent with the first fatliquoring step.

Applicant reiterates in full its previous remarks of Sections A.1 through A.8, *supra*, regarding the prior art teachings, the inferences/creativity of the person having ordinary skill in the art, and the impropriety of using a "functional equivalence" basis for substitutions to synergistic chemical combinations (both in general and in this specific case).

For these same reasons, Claims 62 and 68 are allowable over the cited hypothetical combination.

A.10. Claim 52.

Claim 63, depending from independent Claim 62, places a limitation on the fungicide that it be selected from the group consisting of tolyldiiodomethylsulfone, zinc 2-pyridinethiol-1-oxide, propiconazole, thiabendazole, and tebuconazole.

Applicant reiterates in full its previous remarks of Sections A.1 through A.9, *supra*, regarding the prior art teachings, the inferences/creativity of the person having ordinary skill in the art, and the impropriety of using a "functional equivalence" basis for substitutions to synergistic chemical combinations (both in general and in this specific case).

For these reasons, Claim 63 is allowable over the cited hypothetical combination, as are its dependent claims.

A.11. Claim 64.

Claim 64, depending from independent Claim 62, places a limitation on the fungicide that it be tolyldiiodomethylsulfone.

Applicant reiterates in full its previous remarks of Sections A.1 through A.10, *supra*, regarding the prior art teachings, the inferences/creativity of the person having ordinary skill in the art, and the impropriety of using a "functional equivalence" basis for substitutions to synergistic chemical combinations (both in general and in this specific case).

For these same reasons, Claim 64 is allowable over the cited hypothetical combination.

A.12. Claim 65.

Claim 65, depending from independent Claim 62, places a limitation on the fungicide that it be propiconazole.

Applicant reiterates in full its previous remarks of Sections A.1 through A.11, *supra*, regarding the prior art teachings, the inferences/creativity of the person having ordinary skill in the art, and the impropriety of using a "functional equivalence" basis for substitutions to synergistic chemical combinations (both in general and in this specific case).

For these same reasons, Claim 65 is allowable over the cited hypothetical combination.

A.12. Claim 49.

Claim 49, depending from independent Claim 45, recites that the antimicrobial composition further comprises poly(oxyethylene-(dimethylimino)ethylene(dimethylimino)-ethylenedichloride).

Applicant reiterates in full its previous remarks of Sections A.1 through A.11, *supra*, regarding the prior art teachings, the inferences/creativity of the person having ordinary skill in

the art, and the impropriety of using a "functional equivalence" basis for substitutions to synergistic chemical combinations (both in general and in this specific case).

For these same reasons, Claim 49 is allowable over the cited hypothetical combination.

B. Whether claims 42-43, 48, 56-57, and 66-67 are unpatentable under 35 U.S.C. § 103(a) over Pillay '950 in view of Austin '810 and further in view of Rother, USP 5,888,415.

B.1. Claim 48.

No argument is presented as to Claim 48, which is canceled herein.

B.2. Claims 42 and 56.

Claim 42 depends from independent Claim 23; Claim 56 depends from independent Claim 45. Each claim is appealed without respect to the fate of the other.

In relevant part, claim 42 recites a method including treatment with an antimicrobial composition comprising a biguanide bactericide (about 500-10,000 ppm) and thiabendazole (a fungicide; about 200-5,000 ppm) present in a ratio between about 1:50 to about 10:1 fungicide to biguanide bactericide.

In relevant part, claim 56 recites a method including treatment with an antimicrobial composition comprising a biguanide bactericide (about 500-10,000 ppm) and thiabendazole (a fungicide; about 200-5,000 ppm) present in a ratio between about 1:50 to about 10:1 fungicide to biguanide bactericide.

Where a reference teaches a simple combination, the components of that simple combination are susceptible of substitution (1) by like chemicals or (2) by dissimilar components only if such substitutions are taught or suggested. A synergistic combination is not a simple combination, however; it is one with peculiar and non-cumulative properties unforeseen by those of skill in the art. (Accord MPEP § 716.02(a).) Synergistic combinations are surprising and unexpected, especially in view of the unpredictability of chemical inventions.

When a reference discloses a synergistic combination, then, one of ordinary skill understands that the components of that combination cannot be substituted without a teaching or suggestion that the synergism would be subsequently retained. To be clear, Applicant does not say that substitution is never permitted, merely that a substitution which is not reasonably expected to preserve the synergism—and thus, the principle of operation of the prior art invention—is proscribed and would not be carried out by the ordinarily skilled artisan. This reasonable expectation may spring from the prior art teachings or from the skilled artisan's own creativity.

In predicting the conduct of the skilled artisan, it must be remembered that he does not act against the teachings of the art and would not alter an invention in a way that is discouraged by its disclosure. See *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959); *accord* MPEP 2143.01(VI) ("If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious.").)

Turning now to the rejection, Pillay '950 discloses a synergistic antimicrobial combination (propiconazole and 2-mercaptobenzothiazole, widely regarded as a fungicide and a bactericide, respectively). (Pillay '950, *passim.*) The background of the reference makes clear that others had tried antimicrobial agents in leather treatments. The substance of the Pillay '950 invention is its synergistic antimicrobial combination. For Pillay '950, the synergistic combination is the essential feature of the invention, and Pillay '950 discourages loss of the synergism (e.g., through separation of the synergistic components).

Pillay '950 teaches away from substitutions that do not suggest maintenance of the disclosed synergism. Pillay '950 itself teaches: "Only synergism, which is much less likely than an additive or an antagonistic effect, gives a positive result and, therefore possesses economic advantages." (Pillay '950, column 3, lines 5-7 (underlining added).) A substitution of one of the components of the synergistic combination of Pillay '950, as is done by the Examiner in formulating the rejection, would be expected by those of skill in the art to destroy the synergism discovered by Pillay in the combination.

Pillay '950 discloses a synergistic combination of propiconazole and 2-mercaptobenzothiazole. Applicant asserts, and the Examiner has admitted, that Pillay '950 alone provides no teaching or suggestion to substitute a biguanide compound for its 2-mercaptobenzothiazole. In this instance, one of ordinary skill in the art instead would be led away by Pillay '950 from separation of a synergistic combination and substitution for a component thereof. Pillay '950 and the other relevant references contain no specific teaching or fair suggestion that such separation/substitution would not disturb the synergism.

The Examiner conceded that Pillay '950 (2-mercaptobenzothiazole and propiconazole) and Austin '810 do not teach or suggest a leather treatment method using an antimicrobial composition comprising a biguanide bactericide and thiabendazole. The Examiner asserted that a biguanide bactericide could be substituted for 2-mercaptobenzothiazole per Austin '810, then tendered Rother '415 as providing the missing teaching/suggestion to use thiabendazole in place of Pillay's propiconazole. (Note that this rejection requires that the Pillay '950 combination and its synergism be completely done away with.)

Rother '415 fails to teach or fairly suggest that any synergism of Pillay '950 would be preserved upon replacement of its propiconazole with thiabendazole. Again, Pillay '950 is clear that synergism is the essence of the disclosed combination therein ("[o]nly synergism ... gives a positive result"); one of ordinary skill would be taught away from substitutions absent a showing in or inference from at least one of the references that the Examiner's newly-formed combination would exhibit synergism and retain that "positive result". Rother '415 lacks any such suggestion and does not overcome the teaching-away of Pillay '950.

The references fail to teach or suggest the claimed composition; Pillay '950, the primary reference, teaches away from substitutions that do not preserve the synergism; and the prior art suggests nothing that would lead the skilled artisan to make the Examiner's substitution with any expectation of successful preservation of the Pillay '950 synergism.

The Examiner nonetheless again asserts "functional equivalence"—rather than the chemical equivalence dictated by the Federal Circuit—as the motivation for one of ordinary skill to (a) substitute the polyhexamethylene biguanide of Austin '810 (mentioned at column 6, lines 21-22) for 2-mercaptobenzothiazole and (b) substitute the thiabendazole of Rother '415 for propiconazole. "Functional equivalence" of biguanide/2-mercaptobenzothiazole and of

thiabendazole/propiconazole, which Applicant does not concede herein, nonetheless would be insufficient under *Takeda* to give rise to creative substitution by the skilled artisan.

As Board precedents make clear, however, the present analysis need not seek out precise teachings in the prior art directed to the specific subject matter of the challenged claims, but may take account of the inferences and creative steps that a person of ordinary skill in the art would employ. For the reasons below, there is no reason for the skilled and creative artisan to make the Examiner's proffered substitution with any reasonable expectation that the Pillay '950 synergism would be maintained.

The Federal Circuit has spoken directly regarding the inquiry for chemical combination inventions:

> We elaborated on this requirement in the case of *In re Deuel*, 51 F.3d 1552, 1558 (Fed. Cir. 1995), where we stated that "[n]ormally a prima facie case of obviousness is based upon structural similarity, i.e., an established structural relationship between a prior art compound and the claimed compound.' That is so because close or established "[s]tructural relationships may provide the requisite motivation or suggestion to modify known compounds to obtain new compounds." (Citations omitted.) A known compound may suggest its homolog, analog, or isomer because such compounds "often have similar properties and therefore chemists of ordinary skill would ordinarily contemplate making them to try to obtain compounds with improved properties....
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> While the KSR Court rejected a rigid application of the teaching, suggestion, or motivation ("TSM") test in an obviousness inquiry, the Court acknowledged the importance of identifying "a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does" in an obviousness determination. (Citation omitted.) Moreover, the Court indicated that there is "no necessary inconsistency between the idea underlying the TSM test and the Graham analysis." (Citation omitted.) As long as the test is not applied as a "rigid and mandatory" formula, that test can provide "helpful insight" to an obviousness inquiry. (Citation omitted.) Thus, in cases involving new chemical compounds, it remains necessary to identify some reason that would have led a chemist to modify a known compound in a particular manner to establish *prima facie* obviousness of a new claimed compound.

(*Takeda Chemical Industries, Ltd. v. Alphapharm Pty., Ltd.*, No. 06-1329, slip op. at pp. 8-9 (Fed. Cir., June 28, 2007) (italics added).)

Any creativity attributed to the person having ordinary skill in the art must be tempered by the direct teachings of the relevant prior art. As stated above, the skilled artisan would not take actions that would contradict the teaching of the closest reference. Identification of a reason that would have led a chemist to not modify a known compound—or, in this case, composition—in a particular manner rebuts a *prima facie* showing of obviousness as to the claimed composition.

Here, one skilled in the art would not be motivated to undertake substitutions to the Pillay combination, as the "synergism" and "positive result" of the Pillay '950 combination would not

be preserved. Such substitution must either be taught/suggested in the prior art or find a rational basis in the art, else the references fail to establish a *prima facie* case of obviousness.

It should be noted that a biguanide and 2-mercaptobenzothiazole are not homologs, analogs, or isomers; and that thiabendazole and propiconazole likewise are not homologs, analogs, or isomers. Applicant also points out the odd result of the rejection: after starting with the synergistic combination of Pillay '950, the Examiner now has substituted every component thereof and removed the synergism in the bargain. Pillay '950 cannot reasonably be interpreted as endorsing the wholesale exchange of its parts and destruction of the essence of its invention.

For these reasons, one of ordinary skill would be taught away from substitutions by Pillay '950, would not interpret Austin '810 or Rother '415 as suggesting the modification of Pillay '950 proffered by the Examiner, and would not seek to make the asserted substitution *sua sponte*. The references, alone or together, fail to support a *prima facie* case of obviousness as to either of Claim 42 and 56.

B.3. Claims 43 and 57.

Claim 43 depends from independent Claim 23 and, in relevant part, recites a method including treatment with an antimicrobial composition comprising a biguanide bactericide (about 500-10,000 ppm) and tebuconazole (a fungicide; about 200-5,000 ppm) present in a ratio between about 1:50 to about 10:1 fungicide to biguanide bactericide.

Claim 57 depends from independent Claim 45 and, in relevant part, recites a method including treatment with an antimicrobial composition comprising a biguanide bactericide (about 500-10,000 ppm) and tebuconazole (a fungicide; about 200-5,000 ppm) present in a ratio between about 1:50 to about 10:1 fungicide to biguanide bactericide.

Each claim is appealed without respect to the fate of the other.

Applicant reiterates in full its previous remarks of Sections B.1 through B.2, *supra*, regarding the prior art teachings regarding synergistic combinations and substitutions thereto, the inferences/creativity of the person having ordinary skill in the art, and the impropriety of using a "functional equivalence" basis for substitutions to synergistic chemical combinations (both in general and in this specific case).

The comments of Section B.2 regarding thiabendazole apply with equal force to tebuconazole. Nothing in the cited references or the general state of the art would lead the person of ordinary skill to substitute tebuconazole for Pillay's propiconazole as asserted by the Examiner, as there exists no reasonable expectation that it would preserve the essential synergism of the Pillay '950 combination.

For these same reasons, Claims 43 and 57 are allowable.

B.4. Claim 66.

Claim 66 depends ultimately from independent Claim 62 and recites in relevant part a method including treatment with an antimicrobial composition comprising isothiazolinone (a bactericide; about 500-10,000 ppm) and thiabendazole (a fungicide; about 200-5,000 ppm) present in a ratio between about 1:50 to about 10:1 fungicide to biguanide bactericide.

Applicant reiterates in full its previous remarks of Sections B.1 through B.3, *supra*, regarding the prior art teachings regarding synergistic combinations and substitutions thereto, the inferences/creativity of the person having ordinary skill in the art, and the impropriety of using a

"functional equivalence" basis for substitutions to synergistic chemical combinations (both in general and in this specific case).

The comments of Section B.2 regarding thiabendazole apply with equal force to the method of Claim 66. For these same reasons, Claim 66 is allowable.

B.5. Claim 67.

Claim 67 depends ultimately from independent Claim 62 and, in relevant part, recites a method including treatment with an antimicrobial composition comprising isothiazolinone (a bactericide; about 500-10,000 ppm) and tebuconazole (a fungicide; about 200-5,000 ppm) present in a ratio between about 1:50 to about 10:1 fungicide to biguanide bactericide.

Applicant reiterates in full its previous remarks of Sections B.1 through B.4, *supra*, regarding the prior art teachings regarding synergistic combinations and substitutions thereto, the inferences/creativity of the person having ordinary skill in the art, and the impropriety of using a "functional equivalence" basis for substitutions to synergistic chemical combinations (both in general and in this specific case).

The comments of Section B.3 regarding tebuconazole apply equally to the method of Claim 67. For the same reasons as above, Claim 67 is allowable.

C. Whether claims 40 and 54 are unpatentable under 35 U.S.C. § 103(a) over Pillay '950 in view of Austin '810 and in further view of Lindner, USP 6,228,382.

C.1. Claims 40 and 54.

Claim 40, depending ultimately from independent Claim 23, recites a method which includes treatment with an antimicrobial composition comprising a biguanide bactericide and zinc 2-pyridinethoil-1-oxide (fungicide) present in a ratio between about 1:50 to about 10:1 fungicide to biguanide bactericide.

Claim 54, depending ultimately from independent Claim 45, recites a method which includes treatment with an antimicrobial composition comprising a biguanide bactericide and zinc 2-pyridinethoil-1-oxide (fungicide) present in a ratio between about 1:50 to about 10:1 fungicide to biguanide bactericide.

The rejections of Claims 40 and 54 are appealed together in this Section, although each Claim stands or falls without regard for the decision as to the other.

Where a reference teaches a simple combination, the components of that simple combination are susceptible of substitution (1) by like chemicals or (2) by dissimilar components only if such substitutions are taught or suggested. A synergistic combination is not a simple combination, however; it is one with peculiar and non-cumulative properties unforeseen by those of skill in the art. (Accord MPEP § 716.02(a).) Synergistic combinations are surprising and unexpected, especially in view of the unpredictability of chemical inventions.

When a reference discloses a synergistic combination, then, one of ordinary skill understands that the components of that combination cannot be substituted without a teaching or suggestion that the synergism would be subsequently retained. To be clear, Applicant does not say that substitution is never permitted, merely that a substitution which is not reasonably

expected to preserve the synergism—and thus, the principle of operation of the prior art invention—is proscribed and would not be carried out by the ordinarily skilled artisan. This reasonable expectation may spring from the prior art teachings or from the skilled artisan's own creativity.

In predicting the conduct of the skilled artisan, it must be remembered that he does not act against the teachings of the art and would not alter an invention in a way that is discouraged by its disclosure. See *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959); *accord* MPEP 2143.01(VI) ("If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious.").)

Turning now to the rejection, Pillay '950 discloses a synergistic antimicrobial combination (propiconazole and 2-mercaptobenzothiazole, widely regarded as a fungicide and a bactericide, respectively). (Pillay '950, *passim*.) The background of the reference makes clear that others had tried antimicrobial agents in leather treatments. The substance of the Pillay '950 invention is its synergistic antimicrobial combination. For Pillay '950, the synergistic combination is the essential feature of the invention, and Pillay '950 discourages loss of the synergism (e.g., through separation of the synergistic components).

Pillay '950 teaches away from substitutions that do not suggest maintenance of the disclosed synergism. Pillay '950 itself teaches: "Only synergism, which is much less likely than an additive or an antagonistic effect, gives a positive result and, therefore possesses economic advantages." (Pillay '950, column 3, lines 5-7 (underlining added).) A substitution of one of the components of the synergistic combination of Pillay '950, as is done by the Examiner in formulating the rejection, would be expected by those of skill in the art to destroy the synergism discovered by Pillay in the combination.

Pillay '950 discloses a synergistic combination of propiconazole and 2-mercaptobenzothiazole. Applicant asserts, and the Examiner has admitted, that Pillay '950 alone provides no teaching or suggestion to substitute a biguanide compound for its 2-mercaptobenzothiazole. In this instance, one of ordinary skill in the art instead would be led away by Pillay '950 from separation of a synergistic combination and substitution for a component thereof. Pillay '950 and the other relevant references contain no specific teaching or fair suggestion that such separation/substitution would not disturb the synergism.

The Examiner conceded that Pillay '950 (2-mercaptobenzothiazole and propiconazole) and Austin '810 do not teach or suggest a leather treatment method using an antimicrobial composition comprising a biguanide bactericide and zinc 2-pyridinethoil-1-oxide. The Examiner asserted that a biguanide bactericide could be substituted for 2-mercaptobenzothiazole per Austin '810, then tendered Lindner '382 as providing the missing teaching/suggestion to use zinc 2-pyridinethoil-1-oxide (a.k.a zinc pyrithione) in place of Pillay's propiconazole. (Note that this rejection requires that the Pillay '950 combination and its synergism be completely done away with.)

Lindner '382 fails to provide the missing suggestion. Lindner '382 teaches a microbicidal composition comprising 2-alkylisothiazolin-3-one and a biocide compound (e.g. zinc pyrithione). The reference fails to teach, suggest or provide a reasonable basis for the substitution of one of its components—zinc pyrithione—for one-half of the synergistic combination of Pillay '950.

Such substitution would destroy the synergism of the Pillay '950 combination, and Lindner '382 in no way provides any guidance to the contrary.

One of ordinary skill would be taught away from such substitution absent a showing in Lindner '382 that the newly-formed antimicrobial composition would be at least as effective. Lindner '382 lacks any such showing and does not overcome the teaching-away of Pillay '950. Alone or in combination with the other cited art, Lindner '382 fails to establish a *prima facie* case of obviousness.

The references fail to teach or suggest the claimed composition; Pillay '950, the primary reference, teaches away from substitutions that do not preserve the synergism; and the prior art suggests nothing that would lead the skilled artisan to make the Examiner's substitution with any expectation of successful preservation of the Pillay '950 synergism.

The Examiner nonetheless again asserts "functional equivalence"—rather than the chemical equivalence dictated by the Federal Circuit—as the motivation for one of ordinary skill to (a) substitute the polyhexamethylene biguanide of Austin '810 (mentioned at column 6, lines 21-22) for 2-mercaptobenzothiazole and (b) substitute the zinc pyrithione of Lindner '382 for propiconazole. "Functional equivalence" of propiconazole and zinc 2-pyridinethoil-1-oxide, which Applicant does not concede herein, nonetheless would be insufficient under *Takeda* to give rise to creative substitution by the skilled artisan.

As Board precedents make clear, however, the present analysis need not seek out precise teachings in the prior art directed to the specific subject matter of the challenged claims, but may take account of the inferences and creative steps that a person of ordinary skill in the art would employ. For the reasons below, there is no reason for the skilled and creative artisan to make the Examiner's proffered substitution with any reasonable expectation that the Pillay '950 synergism would be maintained.

The Federal Circuit has spoken directly regarding the inquiry for chemical combination inventions:

> We elaborated on this requirement in the case of *In re Deuel*, 51 F.3d 1552, 1558 (Fed. Cir. 1995), where we stated that "[n]ormally a prima facie case of obviousness is based upon structural similarity, i.e., an established structural relationship between a prior art compound and the claimed compound.' That is so because close or established "[s]tructural relationships may provide the requisite motivation or suggestion to modify known compounds to obtain new compounds." (Citations omitted.) A known compound may suggest its homolog, analog, or isomer because such compounds "often have similar properties and therefore chemists of ordinary skill would ordinarily contemplate making them to try to obtain compounds with improved properties....
>
> While the KSR Court rejected a rigid application of the teaching, suggestion, or motivation ("TSM") test in an obviousness inquiry, the Court acknowledged the importance of identifying "a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does" in an obviousness determination. (Citation omitted.) Moreover, the Court indicated that there is "no necessary inconsistency between the idea underlying the TSM test and the Graham analysis." (Citation omitted.) As long as the test is not applied as a "rigid and mandatory" formula, that test can provide "helpful insight" to an obviousness inquiry.

> (Citation omitted.) Thus, in cases involving new chemical compounds, it remains necessary to identify some reason that would have led a chemist to modify a known compound in a particular manner to establish *prima facie* obviousness of a new claimed compound.

(*Takeda Chemical Industries, Ltd. v. Alphapharm Pty., Ltd.*, No. 06-1329, slip op. at pp. 8-9 (Fed. Cir., June 28, 2007) (italics added).)

Any creativity attributed to the person having ordinary skill in the art must be tempered by the direct teachings of the relevant prior art. As stated above, the skilled artisan would not take actions that would contradict the teaching of the closest reference. Identification of a reason that would have led a chemist to not modify a known compound in a particular manner rebuts a *prima facie* showing of obviousness as to the claimed composition.

Here, one skilled in the art would not be motivated to undertake substitutions to the Pillay combination, as the "synergism" and "positive result" of the Pillay '950 combination would not be preserved. Such substitution must either be taught/suggested in the prior art or find a rational basis in the art, else the references fail to establish a *prima facie* case of obviousness.

It should be noted that a propiconazole and zinc pyrithione are not homologs, analogs, or isomers. Applicant also points out the odd result of the rejection: after starting with the synergistic combination of Pillay '950, the Examiner now has substituted every component thereof and removed the synergism in the bargain. Pillay '950 cannot reasonably be interpreted as endorsing the wholesale exchange of its parts and destruction of the essence of its invention.

Alternatively, the rejection of Claims 40 and 54 can be styled as based on Lindner '382 as modified by Pillay '950. That is, the rejection may be read to assert that Lindner's combination of 2-alkylisothiazolin-3-one and a biocide compound (e.g. zinc pyrithione) could have biguanide bactericide as its biocide compound.

However, Lindner '382 provides no mention of any biguanide bactericides. The skilled artisan is not a drone mindlessly mixing various known chemicals, but is instead guided by the art. Lindner '382 states in its background that many of the known microbicides do not provide durable antimicrobial effect to leather. The exemplary compounds recited by Lindner '382 for its "compound b)" (column 4) fail to suggest to the skilled artisan any compounds chemically similar to a biguanide bactericide.

For these reasons, one of ordinary skill would be taught away from substitutions by Pillay '950, would not interpret Austin '810 or Lindner '382 as suggesting the modification of Pillay '950 proffered by the Examiner, and would not seek to make the asserted substitution *sua sponte*. The references, alone or together, fail to support a *prima facie* case of obviousness as to either of Claim 4 and 54.

VIII. CLAIMS APPENDIX

23. A method for aqueous treatment of leather, comprising:
cleaning the leather;
a first soaking of the leather in an antimicrobial composition in the presence of an emulsifier wherein the antimicrobial composition comprises a biguanide bactericide and a fungicide and wherein the fungicide and biguanide bactericide are present in the composition in a ratio between about 1:50 to about 10:1 fungicide to biguanide bactericide;
a first soaking of the leather in fat liquors and wherein the first soaking of the leather in an antimicrobial composition occurs prior to or concurrent with the first soaking of the leather in fat liquors;
soaking the leather in an aqueous solution containing a tanning agent; and
rinsing the leather.

24. The method according to claim 23, further comprising:
a second soaking of the leather in fat liquors; and
a second soaking of the leather in an antimicrobial composition;
wherein the second soaking of the leather in an antimicrobial composition occurs prior to or concurrent with the second soaking of the leather in fat liquors.

25. The method according to claim 24 further comprising:
rinsing the leather between the first soaking in fat liquors and the second soaking in fat liquors.

26. The method according to claim 23 wherein soaking the leather in an aqueous solution of tanning agent occurs prior to the first soaking of the leather in an antimicrobial composition.

27. The method according to claim 23 wherein soaking the leather in an aqueous solution of tanning agent occurs after the first soaking of the leather in an antimicrobial composition.

28. The method according to claim 23 wherein the fungicide is present in the antimicrobial composition between about 200 ppm and about 5,000 ppm, and the biguanide bactericide is present in the composition between about 500 ppm and about 10,000 ppm.

31. The method according to claim 23 wherein the biguanide bactericide is polyhexamethylene biguanide.

32. The method according to claim 23 wherein the fungicide is selected from the group consisting of tolyldiiodomethylsulfone, zinc 2-pyridinethiol-1-oxide, propiconazole, thiabendazole, and tebuconazole.

33. The method according to claim 23 wherein the fungicide is tolyldiiodomethylsulfone.

34. The method according to claim 23 wherein first soaking of the leather in the antimicrobial composition comprises exhausting the fungicide and bactericide into the interior of the leather.

35. The method according to claim 23 wherein the leather is soaked in the antimicrobial composition for a time sufficient to exhaust at least 1000 ppm of the fungicide and at least 1000 ppm of the bactericide into the leather.

37. The method according to claim 23, further comprising:
finishing the leather.

38. The method according to claim 37, further comprising forming a product from the finished leather.

39. The method according to claim 38 wherein the product is a clothing article, a shoe, a boot, a coat, baggage, a clothing accessory, a tent, outdoor equipment, or upholstery.

40. The method according to claim 23 wherein the fungicide is zinc 2-pyridinethiol-1-oxide.

41. The method according to claim 23 wherein the fungicide is propiconazole.

42. The method according to claim 23 wherein the fungicide is thiabendazole.

43. The method according to claim 23 wherein the fungicide is tebuconazole.

44. The method according to claim 23 wherein the fungicide and biguanide bactericide are present in the composition in a ratio between about 1:50 to about 5:1 fungicide to biguanide bactericide.

45. A method for making an antimicrobial leather, comprising:
a first soaking of a cleaned leather in an antimicrobial composition in the presence of an emulsifier, wherein the antimicrobial composition includes:
a biguanide bactericide having a concentration in the composition of about 500 ppm to about 10,000 ppm based on the weight of the leather, and
a fungicide having a concentration in the composition of about 200 ppm to about 5,000 ppm based on the weight of the leather,
wherein the biguanide bactericide and fungicide are present in the composition in a ratio between about 1:50 to about 10:1 fungicide to biguanide bactericide;
a first fatliquoring of the leather in a first fat liquor; and

wherein the first soaking of the leather in an antimicrobial composition occurs prior to or concurrent with the first fatliquoring.

46. The method of claim 45, further comprising:
a second fatliquoring of the leather in a second fat liquor; and
a second soaking of the leather in the antimicrobial composition in the presence of an emulsifier;
wherein the second soaking of the leather in a second antimicrobial composition occurs prior to or concurrent with the second fatliquoring of the leather.

47. The method of claim 46 further comprising:
rinsing the leather between the first fatliquoring and the second fatliquoring.

48. (**Canceled**)

49. The method of claim 45 wherein the antimicrobial composition further comprises poly(oxyethylene-(dimethylimino)ethylene(dimethylimino)ethylenedichloride).

50. The method of claim 45 wherein the antimicrobial composition further comprises isothiazolinone.

51. The method of claim 45 wherein the antimicrobial composition further comprises a quaternary ammonium compound.

52. The method of claim 45 wherein the fungicide is selected from the group consisting of tolyldiiodomethylsulfone, zinc 2-pyridinethiol-1-oxide, propiconazole, thiabendazole, and tebuconazole.

53. The method of claim 52 wherein the fungicide is tolyldiiodomethylsulfone.

54. The method of claim 52 wherein the fungicide is zinc 2-pyridinethiol-1-oxide.

55. The method of claim 52 wherein the fungicide is propiconazole.

56. The method of claim 52 wherein the fungicide is thiabendazole.

57. The method of claim 52 wherein the fungicide is tebuconazole.

58. The method of claim 45 wherein first soaking of the leather in the antimicrobial composition comprises exhausting the fungicide and biguanide bactericide into the interior of the leather.

59. The method of claim 45 wherein the fungicide and biguanide bactericide are present in the composition in a ratio between about 1:50 to about 5:1 fungicide to biguanide bactericide.

60. A leather article produced by the process of claim 44.

61. The method of claim 60 wherein the leather article is a clothing article, a shoe, a boot, a coat, baggage, a clothing accessory, a tent, an outdoor equipment, or upholstery.

62. A method for making an antimicrobial leather, comprising:

a first soaking of a cleaned leather in an antimicrobial composition in the presence of an emulsifier, wherein the antimicrobial composition includes:

isothiazolinone having a concentration in the composition of about 500 ppm to about 10,000 ppm based on the weight of the leather, and

a fungicide having a concentration in the composition of about 200 ppm to about 5,000 ppm based on the weight of the leather,

wherein the isothiazolinone and fungicide are present in the composition in a ratio between about 50:1 to about 1:5 isothiazolinone to fungicide;

a first fatliquoring of the leather in a first fat liquor; and

wherein the first soaking of the leather in an antimicrobial composition occurs prior to or concurrent with the first fatliquoring.

63. The method of claim 62 wherein the fungicide is selected from the group consisting of tolyldiiodomethylsulfone, zinc 2-pyridinethiol-1-oxide, propiconazole, thiabendazole, and tebuconazole.

64. The method of claim 63 wherein the fungicide is tolyldiiodomethylsulfone.

65. The method of claim 63 wherein the fungicide is propiconazole.

66. The method of claim 63 wherein the fungicide is thiabendazole.

67. The method of claim 63 wherein the fungicide is tebuconazole.

68. The method of claim 62 wherein first soaking of the leather in the antimicrobial composition comprises exhausting the fungicide and isothiazolinone into the interior of the leather.

IX. EVIDENCE APPENDIX.

None.

X. RELATED PROCEEDINGS APPENDIX.

None.

CONCLUSION

For the foregoing reasons, the claims as currently pending are allowable over the cited art. Applicant respectfully requests that the rejections be withdrawn and the application be advanced to allowance.

Respectfully submitted,

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